Assimilating Satellite Observations of Clouds and Precipitation into the NCEP NWP Models

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Abstract

Currently, the majority of satellite data affected by clouds and precipitation are discarded in the NOAA NCEP operational data assimilation systems. This is mainly due to difficulties involved in the forward modeling of radiances affected by clouds and precipitation as well as defining observation and background errors. This presentation gives a report on research activities aimed at developing cloud and precipitation affected radiance data assimilation components in the NCEP operational numerical weather forecast systems. In May 2012, the NCEP Global Data Assimilation System (GDAS) was changed from a 3D-Var Gridpoint Statistical Interpolation (GSI) system to Hybrid Ensemble-3DVar GSI system. Our recent efforts have been focused on testing cloudy radiance data assimilation components in the NCEP Hybrid Ensemble-3DVar GSI system to utilize cloud and precipitation affected satellite measurements such as AMSU-A and ATMS data. In particular, focus has been placed on trying to improve NWP model forecast skill, especially in regions with clouds and precipitation. The potential impacts of cloudy radiance data assimilation on NCEP global NWP forecasts are discussed in this presentation.